

QENOS POLYOLEFINES FACILITIES
BOTANY INDUSTRIAL PARK
SAFETY CASE SUMMARY
2019

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FOREWORD

The purpose of this document is to provide a summary to the community of the Safety Case submitted to the NSW Government regarding the management of process safety at the *Qenos Botany Polyolefines Facilities*.

The Safety Case was submitted by Qenos to the NSW Government as part of the licencing requirements of Major Hazard Facilities under the *Work Health & Safety Regulation 2017*.

Qenos operates two licenced major hazard facilities in NSW; the *Qenos Botany Polyolefines Facilities* and the *Qenos Hydrocarbon Terminals*.

The submission of the Safety Case has provided an ideal opportunity to inform the community about the operation of the facility and provide assurance that Qenos has the necessary trained personnel, equipment and systems to operate these major hazard facilities safely and in accordance with statutory requirements.

Should you require more information, or if there are any questions in relation to information contained in this document, please contact:



Peter Beattie
Operations Manager – Olefines and Site Utilities
Botany Industrial Park
16 – 20 Beauchamp Road
Matraville NSW 2036
Direct Phone: (02) 8336 1335
Or contact can also be made via the 24 hour
Community Hotline (1800 025 138)

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WE ASPIRE TO BE PART OF THE SOLUTION BY PUTTING IN PLACE EQUIPMENT AND SYSTEMS AIMED AT PREVENTING ALL INJURIES, OCCUPATIONAL ILLNESSES AND ENVIRONMENTAL INCIDENTS

A MESSAGE FROM THE CEO



L-R Peter Grosskopf, Stephen Bell and Paul Uhrig sign the Botany Safety Case submissions surrounded by supportive colleagues.

At *Qenos* we believe that all injuries, occupational illnesses and environmental incidents are preventable. Everyone at *Qenos* has a role in protecting the safety and health of our employees, contractors, customers and the community, as well as protecting the environment. Safety, health and environment are not just business aims, they are absolute requirements.

At *Qenos* we use advanced manufacturing to transform Australia's natural resources into polymers that our customers convert into a wide range of products for everyday use by all Australians. The main raw material (or feedstock) used in our process is ethane gas, a co-product of natural gas processing that would otherwise be burnt as a fuel.

For more than 50 years, *Qenos*, and its antecedent companies have operated the manufacturing facilities in Botany (NSW) and Altona (Vic). Our operation and investment in Australia has had many flow-on benefits to Australia's workforce, knowledge and skill base. Today we contribute more than \$1 billion to the Australian economy annually, and are an integral part of the communities in which we operate.

Qenos continues to invest significantly in new equipment to improve the safety of its plants. Each year, multiple cross functional teams of technicians and specialist engineers review the design of equipment and systems to identify opportunities to improve operational safety.

Training is an important part of operating our plants safely. Employees and contractors complete regular training programs to maintain and enhance their skills and knowledge.

The leadership we show in health and safety contributes to continual improvement in safety across the industry in Australia and overseas. Since 2007 we have been taking our safety expertise to China through a knowledge exchange program with 22 of our shareholder's manufacturing plants. This program involves *Qenos* providing education and training to Chinese subsidiaries aimed at improving safety management systems and operational practices.

The *Botany Polyolefines Facilities and Port Botany Hydrocarbon Terminals Safety Case Summaries* is the second produced by *Qenos* in NSW.

At *Qenos* we understand that the world in which we operate is focussed on driving towards greater safety. We aspire to be part of the solution by putting in place equipment and systems aimed at preventing all injuries, occupational illnesses and environmental incidents and sharing our knowledge and experience.

A handwritten signature in black ink that reads "Stephen Bell".

Stephen Bell
Chief Executive Officer

MAJOR HAZARD FACILITIES REGULATIONS

WORK HEALTH AND SAFETY REGULATION 2017

Major Hazard Facilities are regulated under the New South Wales Work Health and Safety Regulation 2017. These regulations can be obtained from the SafeWork NSW website (www.safework.nsw.gov.au).

The *Qenos Botany Polyolefines Facilities* is registered under these regulations as an MHF due to the volume of liquefied petroleum gas and flammable liquids stored and processed at the site.

The objective of the *Work Health and Safety Regulation 2017* is to provide for the safe operation of major hazard facilities in order to:

- Reduce the likelihood of a Major Incident occurring;
- Reduce the consequences to health, safety and damage to property in the event of a Major Incident.

To help achieve this objective, the operator of a Major Hazard Facility must inform the local community and local authority about the safety of the facility's operations. Clause 572 (*Information for local community – general*) of the *Work Health and Safety Regulation 2017*, outlines in detail the information to be provided.

This *Safety Case Summary* document fulfils this requirement in respect to the *Qenos Botany Polyolefines Facilities* and provides the local community with a description of the facilities' operations, the major incidents that could occur and the control measures that are in place to prevent or minimise the consequences of any major incident.

SCHEDULED 15 CHEMICALS

People regularly deal with materials that are potentially hazardous if handled incorrectly. For example, propane used in BBQs, is a potential hazard because it can ignite and catch fire if released to the atmosphere.

Schedule 15 of the *Work Health and Safety Regulation 2017* defines the potentially hazardous materials that must be considered in the scope of the Safety Case. Materials that fall within this definition are called "Scheduled 15 Chemical" within the Safety Case documentation.

MAJOR HAZARD FACILITIES

A Major Hazard Facility has present Schedule 15 Chemicals in a quantity that exceeds a threshold quantity. Examples of Major Hazard Facilities include oil refineries, chemical manufacturing sites, and some warehouses and transport depots.

All Major Hazard Facilities are required to be licensed by *SafeWork NSW*. The *Qenos Botany Polyolefines Facilities* has been a licensed Major Hazard Facility since 2014.





QENOS EMPLOYS AROUND 650 PEOPLE DIRECTLY AND SUPPLIES INDUSTRIES THAT EMPLOY HUNDREDS OF THOUSANDS OF PEOPLE.

MAJOR INCIDENT

A Major Incident is an occurrence that:

- results from an uncontrolled event at the Major Hazard Facility involving, or potentially involving, Schedule 15 chemicals, and
- exposes a person to a serious risk to health or safety emanating from an immediate or imminent exposure to the occurrence.

SAFETY CASE

To obtain a licence, each Major Hazard Facility is required to submit a report (called the Safety Case) to the regulator that demonstrates that the operator of the facility has a comprehensive Safety Management System in place to ensure the facility has:

- Identified all hazards and threats that could result in a Major Incident at the facility
- Identified all potential Major Incident scenarios relating to operation of the facility
- Conducted a comprehensive and systematic safety assessment of identified potential Major Incidents
- Identified and implemented control measures to eliminate or reduce risk to health and safety of the local community and its employees to “So Far as Reasonably Practicable”
- Implemented an emergency plan to control and minimise any Major Incident with potential on-site and/or off-site effects
- Made arrangements to secure the facility

The Safety Case has to be prepared with the involvement of, and in consultation with its employees.

QENOS PTY LTD

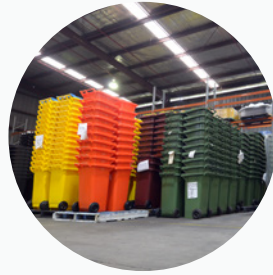
Qenos is Australia’s exclusive manufacturer of polyethylene and a valued supplier of a diverse range of specialty polymers. These are the essential inputs to our local industries such as food and beverage, construction, mining and energy, agriculture and water conservation, plus many more.

These industries deliver products Australians rely on every day. Thanks to the ingenious transformation of naturally occurring resources by the team of process and maintenance technicians, engineers and scientists at Qenos.

Qenos multiplies the value of Australia’s Bass Strait and Cooper Basin gas fields by sustainably harnessing ethane and liquid petroleum gas for local conversion. Then, using advanced technologies at our world-class production facilities in Melbourne’s Altona and Sydney’s Botany Bay, these gases are expertly transformed into safe, clean polyethylene.

Qenos directly contributes more than \$1 billion a year to the Australian economy. Our operations in Sydney and Melbourne employ around 650 people directly and we supply industries that employ hundreds of thousands of people.





QENOS PRODUCTS



The Genos polyethylene product range includes High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE) and Linear Low Density Polyethylene (LLDPE) for use in blow moulding, pipe extrusion, rotational moulding, film extrusion, extrusion coating and injection moulding processes.

Genos is a key supplier across several industries.



BLOW MOULDING

Genos manufactures blow moulding grades for use in a variety of applications, including containers for juice, milk, detergent and pharmaceuticals, industrial drums and intermediate bulk containers, beverage, consumer and industrial product applications.

PIPE EXTRUSION

Genos makes high performance PE100 pipe grades for water supply, irrigation, waste management, mining and gas.



ROTATIONAL MOULDING

Rotational moulding grade range is used for the manufacture of water tanks ("slimline" urban through to large agricultural tanks), marine floats, traffic barriers, canoes, small boats, and almost any hollow, enclosed or open ended shape.



FILM EXTRUSION

Genos produces film grades for a wide range of industries including food and beverage, building and construction, personal care and agriculture.

EXTRUSION COATING

Extrusion coating grades are commonly used in aseptic liquid packaging, flexible packaging, shade cloths, and paperboard packaging applications.



INJECTION MOULDING

Genos produces injection moulding grades for caps, pails, crates, sealant cartridges, mobile garbage bins and produce bins.

QENOS BOTANY (NSW)

The Qenos Botany Polyolefines Facilities are located on the Botany Industrial Park (BIP). The BIP is bounded by Beauchamp Road, Denison Street, Corish Circle, Meadow Way, Baker Street, Anderson Street and the Botany Freight Line.

The BIP is 17 km south of the Sydney central business district on a 37 hectare site adjacent to Botany Bay and its shipping terminal. It is a large integrated petrochemical and chemical manufacturing site. Manufacturing commenced on the site in 1942 by ICI Australia. There are now four companies; Orica, Indorama, Ixom and Qenos operating on the site.

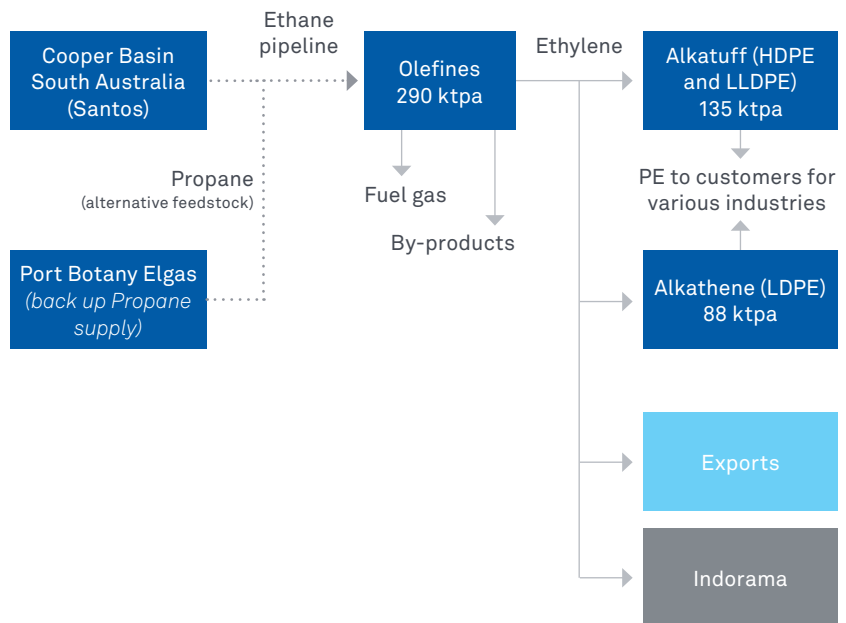


OVERVIEW OF PLANT OPERATIONS

Qenos operates four plants at the Botany Industrial Park, identified as Olefines, Alkatuff, Alkathene and Site Utilities to manufacture ethylene and polyethylene.

SCHEDULE 15 CHEMICALS

All Schedule 15 Chemicals at Qenos are processed and stored in equipment specifically designed for that material. The operating and maintenance procedures are also designed to ensure that the operation is within the mechanical design of the equipment. Emergency shutdown and pressure relief systems are installed where necessary.



OLEFINES PLANT OVERVIEW

MAIN OUTPUT

The *Olefines Plant* processes ethane feedstock sourced from the Cooper basin in South Australia into 290 ktpa of ethylene per year for the two downstream polyethylene plants and other domestic and export customers.

TECHNOLOGY EMPLOYED

The *Olefines Plant* produces ethylene using steam cracking technology used by 117 companies in 55 countries. The *Olefines Plant* was built in 1981.

SCHEDULE 15 CHEMICALS

Ethane: a colourless, odourless, flammable gas supplied via underground pipeline from the Moomba gas fields in South Australia. It is the main feed stock to the *Olefines Plant*.

Propane: a colourless, flammable gas or liquid. It is a supplementary feed stock to the *Olefines Plant* and is supplied by Elgas Ltd via pipeline from Port Botany.

Butene: a colourless, flammable gas or liquid supplied from the Qenos Olefins Plant in Altona Victoria. It is a supplementary feed stock to the *Olefines Plant*.

Ethylene: a colourless, flammable gas or liquid. It is the main product of the *Olefines Plant* and is the feedstock for the *Alkathene* and *Alkatuff Plants*.

Pyrolysis Gasoline: a colourless flammable liquid. It is a by-product of the ethylene process and is sold into Southeast Asia. It is used as a gasoline blending mixture due to its high octane number.



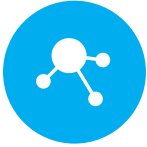
PROCESS DESCRIPTION

Ethane is the main feed stock to the *Olefines Plant*. It is supplied via a dedicated 1375 km pipeline from the Moomba gas fields in South Australia.

The ethane feedstock is diluted with steam and thermally cracked in tubular pyrolysis furnaces to yield a mixture of ethylene, ethane, propylene, butadiene, gasoline, fuel gas and fuel oil. Residual ethane is recycled and re-cracked; other materials leave as products. The gases leaving the furnaces are rapidly cooled and quenched with circulating oil and then with water to condense the heavier products. The furnace effluent gas is quenched, washed with caustic to remove acid gases and then condensed prior to cryogenic distillation which separates the various components of the cracked gas.

Ethylene, recovered at a purity of greater than 99.9%, is mainly used in the Qenos polyethylene plants (*Alkatuff* and *Alkathene Plants*) and *Indorama* plants on the BIP. It is also possible to import or export liquid ethylene via the *Port Botany Hydrocarbon Terminal*.





ALKATHENE PLANT OVERVIEW

MAIN OUTPUT

The *Alkathene Plant* produces about 88 ktpa of Low Density Polyethylene (LDPE) per year.

TECHNOLOGY EMPLOYED

The *Alkathene Plant* uses the ICI UK high pressure polythene technology to produce Low Density Polyethylene (LDPE). There are over 75 reactors operating around the world using the ICI High Pressure Polythene technology or a variation of it.

The plant consists of four parallel production trains. Units 1 and 2 were built in 1957, Unit 3 in the early 1960s, and Unit 4 in 1984.



The unreacted gas is re-compressed, and recycled to the reactor.

PROCESS DESCRIPTION

LDPE is produced using a high pressure continuous reaction process with ethylene as the feedstock. In each unit, ethylene is compressed in two stages to the reactor pressure. The reaction takes place continuously in a stirred cylindrical vessel and organic peroxide catalysts are injected into the reactor vessel by catalyst dosing pumps. On average, about 18% of the ethylene is converted to polythene per pass.

The gas and polyethylene mixture leaves the reaction vessel and is cooled and separated. The unreacted gas is re-compressed, and recycled to the reactor.

The polyethylene is pelletised by a gear pump or screw extruder which extrudes the polyethylene through a die-face cutter producing small granules. The granules are stored in silos. They are then despatched to customers in bulk containers.

SCHEDULE 15 CHEMICALS

Ethylene: a colourless, flammable gas supplied by pipeline from the *Olefines Plant*. It is the main feedstock for the *Alkathene Plant* to manufacture polyethylene.

Peroxide Initiators: a colourless, flammable liquid is used as a reaction initiator.





ALKATUFF PLANT OVERVIEW

MAIN OUTPUT

The *Alkatuff Plant* manufactures polyethylene products known as Linear Low Density Polyethylene (LLDPE) and High Density Polyethylene (HDPE).

TECHNOLOGY EMPLOYED

The *Alkatuff Plant* employs *Unipol™ Low Pressure, Fluidised Bed Technology*. The *Unipol™* process is licensed from Univation. There are over 100 reactor lines in 25 countries producing polyethylene using the *Unipol™* process. The *Alkatuff Plant* was built in 1992.

PROCESS DESCRIPTION

The polymerisation reaction takes place in a fluidised bed reactor into which the ethylene supplied by pipeline from Olefines, hexene, hydrogen, isohexane, catalyst activator and catalyst are injected. A recycle gas flow is used to cool the reactor and is maintained by a single stage centrifugal recycle gas compressor and heat exchanger.

The polyethylene resin produced is purged of unreacted hydrocarbons which are recovered. The resin is then extruded and cut up to form granules which are stored and loaded into road tankers for bulk delivery to customers.

SCHEDULE 15 CHEMICALS

Ethylene: a colourless, flammable gas supplied by pipeline from the Olefines Plant. It is the main feedstock for the *Alkatuff Plant* to manufacture polyethylene.

Hydrogen: a colourless, odourless, flammable gas supplied and stored in dedicated compressed gas cylinders. It is used in the reaction to modify the properties of the polyethylene product to meet customers' requirements.

Hexane: is a flammable gas. It is used to improve the cooling of the reaction process.

Hexene: a flammable liquid. It is used in the reaction to modify the properties of the polyethylene product to meet customers' requirements.



SITE UTILITIES PLANT OVERVIEW



MAIN OUTPUT

Site Utilities provides steam and power to all Genos Botany plants and also the neighbouring Ixom and Indorama Plants. Steam is used on the BIP site as a heating medium in each of the plants.

PROCESS DESCRIPTION

The Site Utilities Plant comprises three pressure boilers, two of which are coal-fired and the other natural gas-fired.

SCHEDULE 15 CHEMICALS

Natural Gas: colourless, flammable gas used as fuel for the main steam boiler. It is supplied by pipeline from the main natural gas grid by AGL Energy Ltd.



SAFETY CASE SUMMARY

The *Work Health and Safety Regulation 2017* requires operators of Major Hazard Facilities to prepare and regularly update a Safety Case.

The *Qenos Polyolefines Facilities Safety Case* demonstrates that the site is being managed to ensure that health and safety risks are being reduced “so far as is reasonably practicable”.

In developing the Safety Case, Qenos has used the following approach:

- Identify all hazards that may lead to a potential Major Incident
- Assess the likelihood and consequences of the potential Major Incident
- Identify the controls in place that reduce the risk of a potential Major Incident to “so far as is reasonably practicable”
- Ensure that the Safety Management System maintains the integrity of the controls and monitors these control measures and risks
- Ensure the emergency plan addresses the potential Major Incidents.

The assessments were carried out by Qenos personnel and included process and maintenance technicians, specialist engineers.

The Safety Case includes the following main components:

- **Facility Description:**
Details the processes in the MHF installation
- **Risk Assessment:**
Details the process used to identify and assess the risk of a Major Incident
- **Safety Management System:**
Describes how the Safety Management System maintains operational integrity
- **Emergency Response Plan:**
Details action to be taken in the event of a Major Incident.

Offsite risks to the nearby community who could be impacted by a potential Major Incident are also examined in the Safety Case.



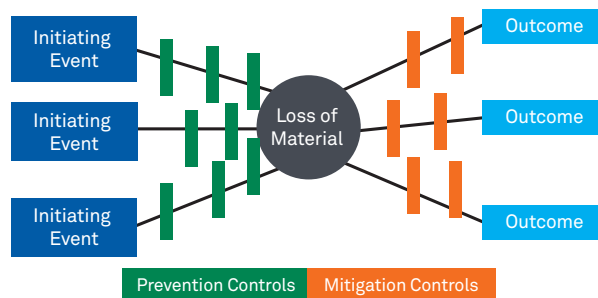
SAFETY ASSESSMENT

The focus of the safety assessment is to comprehensively investigate the scenarios that may lead to potential Major Incidents. All aspects of risk to health and safety and damage to property associated with potential Major Incidents are considered in the safety assessment. The objective of the safety assessment is to reduce the risk to “So Far As is Reasonably Practicable”.

The safety assessment starts by identifying the Schedule 15 Chemicals that exist in the facility. The safety assessment then identifies the scenarios where these materials could be released from their containment system. These scenarios include over pressuring of equipment, over-filling of tanks, equipment failure, corrosion, failure of operating or maintenance procedures, mechanical impact or fatigue.

In order to ensure the Major Incidents are adequately controlled and to determine if additional controls are deemed necessary; a Layers of Protection Analysis is conducted for each identified Major Incident scenario. This involves a thorough analysis of all existing controls and identifies any need for additional controls. This analysis is a systematic way of reviewing the control measures to ensure they are linked to the causes and hazards that make up a Major Incident as well as the consequences of the Major Incident.

The Layers of Protection Analysis can be represented as a bowtie diagram, as shown below:



The layers of controls on the left hand side of the diagram are the *preventative controls* in place to prevent a loss of material from occurring. Controls on the right-hand side of the diagram are the *mitigating controls* in place to prevent or reduce the consequences of the Major Incident scenario after the material has been lost.

Hence, the Layers of Protection Analysis represents a review that focuses on the preventative and mitigating controls and examines the risk control measures that are currently in place, ensuring a robust systematic approach to identify if the controls are sufficient and effective or where the inclusion of additional controls or changes in the existing controls will reduce the risk associated with the Major Incident to “so far as is reasonably practicable”.

CONTROL MEASURES

Control measures are the equipment, systems and procedures that reduce the risk of a Major Incident.

Preventative controls are designed to stop a potential Major Incident from occurring. Examples of preventative controls include: equipment design specifications, instrumented control systems, emergency shutdown systems, pressure relief systems, equipment inspection strategies and schedules, operating procedures, vessel isolation procedures, maintenance procedures, permit to work procedures, and training.

Mitigating controls are designed to reduce the severity of the consequences. These are control measures that ensure that if there is a loss of material, it is detected and controlled quickly to minimise the likelihood that it will escalate and become serious. Examples of mitigating controls include the following: site layout and equipment separation, gas detection systems, site alarms, fireproofing, automated water deluge systems, fixed firefighting systems, firefighting foam injection facilities and emergency response procedures.

Both preventative and mitigating controls are designed to recognised Corporate, Australian and International Standards and are subject to regular performance assessment and ongoing auditing to ensure they are effective, reliable and robust.



SAFETY MANAGEMENT SYSTEM

A Safety Management System provides a systematic way to identify hazards and control risks while maintaining assurance that these risk controls are effective. The Safety Management System at Genos is called *SHEOS* (Safety, Health and Environment Operating System).

SHEOS is an integrated operating system used by Genos to address all its Safety Health and Environment obligations including the ongoing prevention and mitigation of Major Incidents.

SHEOS is made up of 21 *SHEOPs* (Safety, Health and Environment Operating Practices) to provide a comprehensive Safety Management System fit for purpose for a Major Hazard Facility.

The following is a summary of the *SHEOPs* which have a direct impact upon the prevention of Major Incidents.

SHEOP 1.1 Leadership, Management, Commitment & Accountability

This *SHEOP* outlines a philosophy that acknowledges that management provides the perspective, establishes the framework, sets the expectations and provides the resources for successful operations. It is formally acknowledged that the assurance of operations integrity requires management and leadership that is visible to the organisation and accountable at all levels.

SHEOP 2.1 Risk Analysis, Assessment & Management

SHEOP 2.1 aims to ensure that all the safety, health and environmental hazards associated with the operation of Genos are identified and actions taken to reduce the risk associated with these hazards will be reduced to “so far as is reasonably practicable”. *SHEOP 2.1* provides the structure for comprehensive risk analyses by providing the essential programs, tools and information for risk assessment and management for existing facilities and new projects.

SHEOP 3.1 Facilities Design & Construction

This *SHEOP* covers projects from design to start-up, controlling hazards associated with new equipment and facilities. The purpose of *SHEOP 3.1* is to ensure facilities are developed, designed, constructed and handed over to Operations in accordance with company and regulatory requirements and standards.

SHEOP 4.1 Process and Facilities Information/ Documentation

This *SHEOP* prescribes accessibility, accuracy and validity requirements for engineering drawings, design data and equipment records. The *SHEOP* arises from an appreciation that current information on the configuration and capabilities of process and facilities, properties of materials handled, safety, health and environmental hazards and regulatory requirements are essential in the management of risk and compliance with statutory requirements.

SHEOP 5.1 Personnel Safety

This *SHEOP* focuses on the interface between people and their work environment. It establishes systems that actively monitor behaviour and workplace conditions and which take steps to prevent potential injuries. Important aspects of this *SHEOP* include the continued raising of awareness of hazards, safety analysis of specific job tasks, proper use of personal protective equipment and employee recognition.

SHEOP 5.3 Personnel

This *SHEOP* is designed so the site has the necessary processes in place for the selection, placement and ongoing assessment of employees in key Safety, Health and Environmental positions.

SHEOP 5.4 Training and Competence

This *SHEOP* ensures that Genos has in place the necessary training programs to ensure that all employees and contractors have the skills and knowledge to perform their job safely, and in an environmentally responsible manner.

SHEOP 6.1 Operations and Maintenance Procedures & Alarm Management

This SHEOP ensures adequate procedures are in place for normal and abnormal operations.

SHEOP 6.2 Work Permits

A work permit system is necessary to ensure that jobs are adequately planned and that work is performed safely. This SHEOP covers the procedures for obtaining work permits and the training needed to ensure that equipment is properly prepared, jobs are planned and executed, and equipment returned to service.

SHEOP 6.3 Inspections and Maintenance Requirements

This SHEOP defines the inspection, maintenance and monitoring requirements for various types of equipment including: fixed, rotating, electrical, instrumentation, mobile, hoses, tools, and rigging equipment. These activities include the definition and execution of quality control and quality assurance of materials and workmanship on equipment covered by this SHEOP.

SHEOP 6.4 Reliability and Control of Defeat of Critical Systems and Devices

The objective of this SHEOP is to ensure that all Qenos plants have a structured approach to the identification, maintenance and testing of safety, health and environment (SHE) critical equipment and no SHE Critical device/system is defeated unless alternative protection has been implemented to manage the risk.

SHEOP 6.6 Regulatory Compliance

This SHEOP covers all applicable legislation with obligations on Qenos affecting Safety, Health and Environment of all personnel at Qenos, the community and the environment.

SHEOP 7.1 Management of Change

This SHEOP established the requirements for the management of change. The manufacturing process is designed to safely function within specified operational and equipment limits. A change occurs each time Qenos alters documentation, facilities, operating mode, materials or personnel responsible for these areas. Making changes can invalidate previous risk assessments and / or create new risks. To maintain acceptable risk levels all changes are reviewed by appropriately qualified personnel and the implementation of changes must be managed.

SHEOP 8.1 Third Party Services

This SHEOP covers contractors doing work on Qenos' behalf, understanding pertinent Qenos Safety, Health and Environmental requirements and carry out such work in accordance with those requirements.

SHEOP 9.1 Incident Reporting, Analysis and Follow Up

This SHEOP requires the recording and analysis of data relating to SHE incidents in order to identify root causes and to implement effective corrective actions to prevent recurrence.

SHEOP 10.1 Emergency Preparedness

This SHEOP is built on the precept that emergency planning and preparedness are essential to ensure that, in the event of an incident, all necessary actions are taken for the protection of the public, company personnel, contractors, the environment and assets.

SHEOP 10.2 Community Awareness

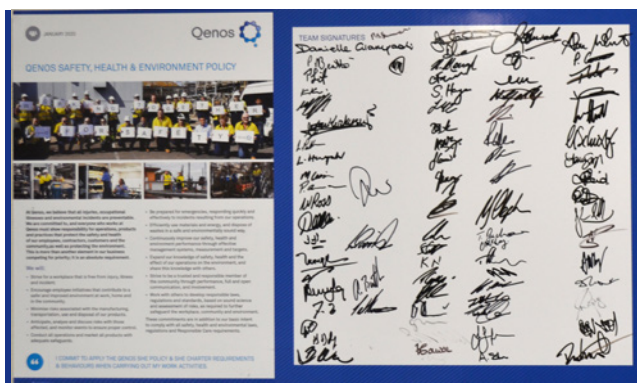
This SHEOP recognises that Employee and Community awareness is a key factor in maintaining public trust and confidence in the integrity of operations. Trust and confidence are earned through open communications with employees and the local community regarding the company's performance. Qenos maintains an ongoing commitment to provide opportunities for, and encouragement to, employees to participate in the communication of activities within the community, including those regarding the community's Safety, Health and Environmental concerns about operations.

SHEOP 11.1 Assessment and Improvement

This SHEOP covers self-assessments and verification assessments at Qenos. Measurement and verification indicators are developed and maintained within the system for each SHEOP. The objective is to assess the degree to which the SHEOP Requirements are met and to support the continuous improvement of SHEOS. Effective assessment of the performance of SHEOS is essential in order to improve performance, maintain accountability and ensure operational integrity.

QUALITY ASSURANCE

Supporting SHEOS and providing continuous improvement is a Quality Assurance process. This process ensures the scope, objectives, procedures and responsibilities are documented and communicated. In addition SHEOP 11.1 *Assessment and Improvement*, ensures each SHEOP is regularly audited to check its status and effectiveness.



INCIDENT PREPAREDNESS AND RESPONSE

EMERGENCY RESPONSE EQUIPMENT AND FACILITIES

Qenos is well prepared to handle Major Incidents. The controls and training in place ensure any potential for offsite consequence is minimised.

Emergency response resources to respond to incidents and work with the emergency services to manage incidents include:

- Onsite shift teams trained in emergency response;
- Safety Response Vehicle (SRV) – fire tender with water, foam and dry chemical firefighting capability and rescue equipment;
- Site Safety Centre (additional emergency safety equipment including ropes, harnesses, SCBA units, Oxy-Viva type resuscitator, defibrillator, acid suits and other specialised equipment);
- Emergency communications – dedicated site emergency radio, plant radios, internal and external land lines, and emergency plant alarms (fire alarms relayed to Fire and Rescue NSW);
- Fire water systems – two fire water storage tanks (in excess of 12 million litres) with automatic pumping control stations (combination of diesel and electric pumps) supplying fire water through a fire ring main to fixed fire monitors, hydrants and deluges (deluges are required for specific equipment e.g. loading bays, certain storage vessels as prescribed in engineering standards);
- Booms and absorbents for chemicals spills to protect waterways.

PLANT ALARM SIRENS

Plant Alarm Sirens at Qenos are to alert on-site workers and initiate an on-site emergency response if needed. These sirens are not used to alert the community to danger. Emergency Services are responsible for informing the community.

All plants conduct regular testing of alarm systems and leak detection systems to ensure they are available and in good working order. Neighbours may hear the several alarms being tested around the site on Thursdays and at other times for example, simulated emergency training exercises.



FLARES

Flares are a key safety and environment control system used in refineries and petrochemical facilities. They will safely burn flammable gases which cannot be recovered or recycled in the processing plants. Flares are also used to safely burn process gas when a plant is shutdown, this ensures that the integrity of the plant and the safety of the community are ensured.

Genos has four flares in operation in the north-western corner of the Botany Industrial Park (near the intersection of Anderson and Baker Streets, Banksmeadow).

These include:

- Two enclosed ground flares (approximately 12m high) for the Olefines Plant.
- One elevated flare (approximately 70m high) for the Olefines Plant.
- One combined elevated/ground flare (approximately 20m high) for the Alkatuff Plant.

The use of flares is minimised to the extent that is possible. This is to reduce any impacts the flaring has on the community and to maximise the efficiency of operations. Examples of when the flares need to be used include:

- Taking the process plants off line for maintenance
- Starting the process plants up following maintenance
- When safety shutdowns activate
- Purging of gases during plant operations
- Utility interruptions such as power failures.

The flares can have the following impacts off site:

- Light/Flames
- Smoke
- Noise
- Emissions/odours.

The elevated flare is very noticeable and from some locations it may appear that there is a large uncontrolled fire. Members of the community may sometimes become concerned when large flares are visible and may mistake them for a fire or emergency at the plant. This is not the case; the flare provides a controlled combustion of the gases to ensure the safe operation of the facility.



INSPECTION AND TESTING PROGRAMS

An on-going program of inspection, testing, maintenance and replacement is in place to ensure that all emergency response equipment and facilities are effective when called on for use.

TRAINING

Incident preparedness and response training is designed and implemented to equip relevant personnel with the knowledge and skills required.

Training schedules are developed to ensure effective implementation occurs across all areas of Genos which includes:

- Simulated exercises with the *NSW Police Force* and *Fire and Rescue NSW* personnel
- Simulated Emergencies
- Training in the emergency response

To ensure the continued effectiveness of response plans, procedures and training, a comprehensive review of completed training and any actual emergency incidents is undertaken and opportunities for improvement are identified.

QENOS HAS RIGOROUS AND ROBUST SYSTEMS IN PLACE TO PREVENT AND MANAGE EMERGENCY EVENTS

POTENTIAL MAJOR INCIDENTS

The potential Major Incidents identified at Qenos are extremely unlikely to have offsite consequences.

Potential Major Incidents and their worst case consequences that may occur due to the release of a Schedule 15 Chemical is summarised in the table below.



Hazards	Potential Major Incident	Magnitude	Potential Off-Site Consequences
Flammable gas or liquid release	Fire/explosion	Expected to only have onsite impact; but could impact nearby residential and commercial operations depending upon wind direction and strength.	<ul style="list-style-type: none"> Injuries as a result of damage to windows or other building damage resulting from an explosion Exposure to smoke may cause respiratory difficulty. Other impacts may include <ul style="list-style-type: none"> Visible flaring Noise Odour Public disruption (e.g. actions by emergency services such as road closure or evacuation)
Combustible liquid release	Fire	Expected to only have onsite impact	<ul style="list-style-type: none"> Exposure to smoke may cause respiratory difficulty. Other impacts may include <ul style="list-style-type: none"> Visible flaring Noise Odour Public disruption (e.g. actions by emergency services such as road closure or evacuation)



WHAT TO DO IN EMERGENCY

In the unlikely event of a major emergency at Qenos, the combat agencies (usually the NSW Police Force) will provide essential information to the community. Usually you will be advised to stay in your home and await further instructions.

If a major emergency was to occur, unless otherwise directed by emergency services, it is recommended that you immediately:

- 1) Go indoors.
- 2) Close external doors and windows.
- 3) Switch off any air conditioners, heaters or exhaust fans.
- 4) Remain indoors until you receive instructions from the emergency services.
- 5) Also, tune into the radio or television and listen for information. The 'all clear' will be given by the emergency services.
- 6) After the 'all clear' has been given open doors and windows to restore ventilation.

Please cooperate fully with the instructions given by the emergency services.

Emergency Response Service: 1800 033 011

If you have any queries on what to do in an emergency please contact the BIP via the 24 hour Community Hotline (1800 025 138).



**BIP**

Botany Industrial Park.

Consequence

The outcome of a Major Incident.

Control Measures

The equipment, programs and procedures used to prevent or reduce the potential consequence of a Major Incident.

Hazard

A chemical or physical condition that has the potential for causing harm to people, property, or the environment.

HDPE

High Density Polyethylene.

LDPE

Low Density Polyethylene.

LLDPE

Linear Low Density Polyethylene.

LOPA

Layers of Protection Analysis – a risk assessment technique used in the safety assessment to assess the likelihood of a Major Incident.

Major Incident

An uncontrolled incident involving a Schedule 15 chemical (as defined in the *Work Health and Safety Regulation 2017*) exposing or potentially exposing a person to an imminently serious risk to safety or health.

MHF

Major Hazard Facility.

MHF Regulations

Chapter 9 of the *Work Health and Safety Regulation 2017*.

Polyolefines

A collective term to describe the upstream olefines and downstream polymer manufacturing facilities.

Risk

The product of the likelihood of a potential Major Incident and the severity of the consequences.

Safety Assessment

A comprehensive and systematic investigation of hazards that may lead to potential Major Incidents.

Safety Case

A report prepared under Chapter 9 of the *Work Health and Safety Regulation 2017*.

Safety Management System

A comprehensive management system to identify hazards and control risk and ensure risk controls are effective.

SafeWork NSW

The NSW regulator responsible for the licencing of Major Hazard Facilities.

Schedule 15 Chemicals

The hazardous chemicals and their threshold quantity used in the MHF Regulations to identify a Major Hazard Facility.

SHE

Safety, Health & Environment.

SHEOP

Safety Health & Environment Operating Practice.

SHEOS

Safety Health & Environment Operating System. The name of the Qenos Safety Management System.

So Far As is Reasonably Practicable

Reasonably practicable means doing what is reasonably able to be done to ensure the health and safety of workers and others.



GLOSSARY

Disclaimer

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